WHAT IS CLAIMED IS:

1. An ink jet recording apparatus comprising:

an ink jet recording head which includes a plurality of nozzles divided into a plurality of groups and ejects an ink from a plurality of the nozzles;

a carriage which has the ink jet recording head mounted thereon and is driven to reciprocate in a direction orthogonal to a transferring direction of a recording medium;

a sensor which is provided in a drive range of the carriage and provided in such a manner that an optical axis of detection light thereof is inclined with respect to a moving direction of the carriage, and optically detects the ink ejected from each of a plurality of the nozzles in the ink jet recording head; and

a controller which controls an ejection operation of the ink of the ink jet recording head, inspects an ejection state of the ink from a plurality of the nozzles based on an output result from the sensor, and shifts an ink ejection timing every group when inspecting the ink ejection state of the ink jet recording head, a time of the shift being shorter than an ejection cycle in image recording.

2. The ink jet recording apparatus according to claim 1, wherein the controller sequentially changes the nozzles to eject the ink every group.

3. The ink jet recording apparatus according to claim 2, wherein the controller causes one nozzle to continuously eject a plurality of inks.

4. The ink jet recording apparatus according to claim 3, wherein the controller makes an ink ejection mode of a reference nozzle from that of any other nozzle.

5. The ink jet recording apparatus according to claim 1, wherein the controller makes ink ejection cycles in the respective groups equal to each other when inspecting an ink ejection state.

6. The ink jet recording apparatus according to claim 1, wherein the controller makes ink ejection cycles in the respective groups equal to ink ejection cycles in image recording in case of inspecting an ink ejection state.

7. The ink jet recording apparatus according to claim 1, wherein the controller controls an ink ejection timing of each group in such a manner that ejection of the ink from a first group in a plurality of the groups and ejection of the ink from a second group in a plurality of the groups are alternately carried out.

8. The ink jet recording apparatus according to claim 1, wherein the controller controls the ink ejection timing in such a manner that the ink is ejected from a nozzle in any other group in an ink

ejection cycle in the first group in a plurality of the groups.

9. The ink jet recording apparatus according to claim 1, wherein, assuming that the number of the groups is X and the ink ejection cycle is T seconds, the controller controls the ink ejection timing in such a manner that the ink ejection cycle of each of the groups is shifted from an ejection cycle of a group which has precedently ejected the ink by T/X seconds.

10. The ink jet recording apparatus according to claim 1, wherein the controller sets the shifting time Tz as follows:

$Tt < Tz < T - Tt$

Tt: time required for the ink to pass through the detection light

T: ink ejection cycle

11. The ink jet recording apparatus according to claim 1, wherein a moving speed of the carriage when inspecting the ink ejection state is set equal to a moving speed in image recording.

12. The ink jet recording apparatus according to claim 11, wherein the drive range of the carriage has a constant speed drive area in which the carriage is driven at a constant speed and an inversion drive area in which the carriage is driven to be inverted, and the sensor is provided in the fixed speed drive area.

13. The ink jet recording apparatus according

to claim 1, wherein the sensor is provided in such a manner that the optical axis of the detection light thereof is inclined with respect to a drive direction of the carriage at 45 degrees.

14. The ink jet recording apparatus according to claim 1, wherein the sensor detects the ink ejection state in a timing according to the ink ejection timing of each of the groups.

15. An ink jet recording apparatus comprising:

a plurality of ink jet recording heads each of which includes a substantially linear nozzle column consisting of a plurality of nozzles;

a carriage which has a plurality of the ink jet recording heads mounted thereon in such a manner that each of a plurality of the ink jet recording heads is arranged along a direction orthogonal to a recording medium transferring direction and the nozzle columns thereof are arranged along the recording medium transferring direction, and which is driven in a direction orthogonal to the recording medium transferring direction;

a sensor which is provided in a drive range of the carriage and provided in such a manner that an angle of detection light thereof is inclined at an angle so as to cross a plurality of the nozzle columns, and optically detects an ink ejected from a plurality of the nozzle columns; and

a controller which controls an ink ejection operation of a plurality of the ink jet recording heads, inspects an ejection state of the ink from a plurality of the nozzles based on an output result from the sensor, and shifts an ink ejection timing every plural nozzle columns when inspecting the ink ejection state, a time of the shift being shorter than an ejection cycle in image recording of each of the nozzle columns.

16. The ink jet recording apparatus according to claim 15, wherein the ink ejection controller sequentially changes the nozzles to eject the ink every nozzle column.

17. The ink jet recording apparatus according to claim 16, wherein the controller causes one nozzle to continuously eject a plurality of inks.

18. The ink jet recording apparatus according to claim 17, wherein the ink ejection controller makes an ink ejection mode of a reference nozzle different from that of any other nozzle every nozzle column.

19. The ink jet recording apparatus according to claim 15, wherein the controller makes ink ejection cycles in the respective nozzle columns equal to each other when inspecting the ink ejection state.

20. The ink jet recording apparatus according to claim 15, wherein the controller makes the ink ejection cycles in the respective nozzle columns equal to ink

ejection cycles in image recording in case of inspecting the ink ejection state.

21. The ink jet recording apparatus according to claim 15, wherein the controller controls an ink ejection timing of each of the nozzle columns in such a manner that an ink ejection operation from a nozzle of a first nozzle column in a plurality of the nozzle columns and an ink ejection operation from a nozzle of a second nozzle column arranged so as to be adjacent to the first nozzle column are alternately carried out.

22. The ink jet recording apparatus according to claim 15, wherein the controller controls the ink ejection timing in such a manner that the ink is ejected from the nozzle of the second nozzle column arranged so as to be adjacent to the first nozzle column in the ink ejection cycle of the first nozzle column in a plurality of the nozzle columns.

23. The ink jet recording apparatus according to claim 15, wherein, assuming that the number of the nozzle columns is X and the ink ejection cycle is T seconds, the controller controls the ink ejection timing in such a manner that the ink ejection cycle of each of the nozzle columns is shifted from an ejection cycle of a nozzle column which has precedently ejected the ink by T/X seconds.

24. The ink jet recording apparatus according to claim 15, wherein the controller sets the shifting time

Tz as follows:

$$Tt < Tz < T - Tt$$

Tt: time required for the ink to pass through the detection light

T: ink ejection cycle

25. The ink jet recording apparatus according to claim 15, wherein a moving speed of the carriage when inspecting the ink ejection state is set equal to a moving speed in image recording.

26. The ink jet recording apparatus according to claim 25, wherein the drive range of the carriage has a constant speed drive area in which the carriage is driven at a constant speed and an inversion drive area in which the carriage is operated to be inverted, and the sensor is provided in the constant speed drive area.

27. The ink jet recording apparatus according to claim 15, wherein the sensor is provided in such a manner that the optical axis of the detection light thereof is inclined with respect to a drive direction of the carriage at 45 degrees.

28. The ink jet recording apparatus according to claim 15, wherein the sensor detects the ink ejection state in a timing corresponding to the ink ejection timing of each of the nozzles.

29. An ink jet recording apparatus comprising:

an ink jet recording head having a substantially

linear nozzle column consisting of a plurality of nozzles divided into a plurality of groups;

a sensor which is provided in such a manner that detection light is inclined at an angle so as to cross the nozzle column, and which detects passage of an ink when the ink ejected from each nozzle in the nozzle arrangement comes across the detection light; and

a controller which controls an ink ejection operation of the ink jet recording head, relatively moves the ink jet recording head and the sensor, inspects an ink ejection state by causing the ink ejected from all of the nozzles constituting the nozzle column to pass through the detection light, and shifts an ink ejection timing every group when inspecting the ink ejection state, a time of the shift being shorter than an ejection cycle in image recording of each of the groups.

30. The ink jet recording apparatus according to claim 29, wherein the ink ejection controller sequentially changes a nozzle to eject the ink every group.

31. The ink jet recording apparatus according to claim 30, wherein the controller causes one nozzle to continuously eject a plurality of inks.

32. The ink jet recording apparatus according to claim 31, wherein the ink ejection controller makes an ink ejection mode of a reference nozzle from an ink ejection mode of any other nozzle every nozzle group.

33. The ink jet recording apparatus according to claim 29, wherein the controller makes ink ejection cycles in the respective groups equal to each other when inspecting the ink ejection state.

34. The ink jet recording apparatus according to claim 29, wherein the controller makes the ink ejection cycles in each of the groups equal to ink ejection cycles in image recording in case of inspecting the ink ejection state.

35. The ink jet recording apparatus according to claim 29, wherein, assuming that the number of the groups is X and the ink ejection cycle is T seconds, the controller controls an ink ejection timing in such a manner that the ink ejection cycle of each of the groups is shifted from an ejection cycle of a group which has precedently ejected the ink by T/X seconds.

36. The ink jet recording apparatus according to claim 29, wherein the controller sets the shifting time Tz as follows:

$$Tt < Tz < T - Tt$$

Tt: time required for the ink to pass through the detection light

T: ink ejection cycle

37. The ink jet recording apparatus according to claim 29, wherein the sensor is provided in such a manner that the optical axis of the detection light thereof is inclined with respect to a drive direction

of the carriage at 45 degrees.

38. The ink jet recording apparatus according to claim 29, wherein the sensor detects the ink ejection state in a timing according to the ink ejection timing of each of the groups.